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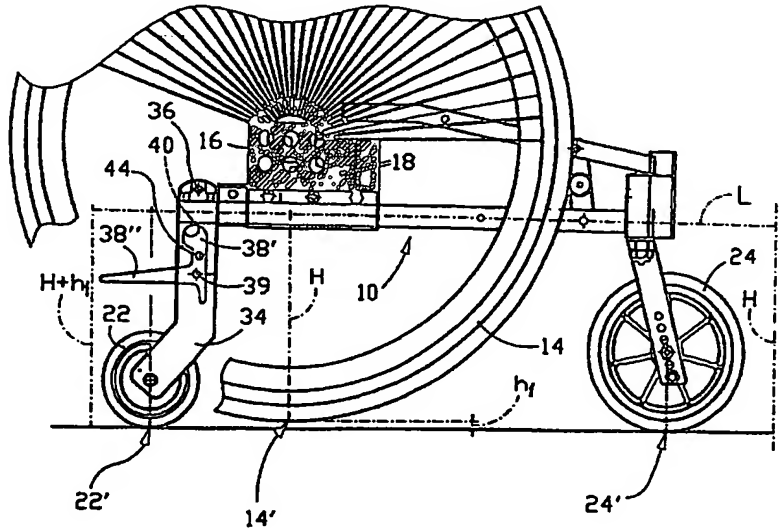

(57) Abstract

A drivable undercarriage for a wheelchair comprises front wheels (24), primary big detachable rear wheels (14) and secondary, small rear wheels (22) attached to the undercarriage frame (10) by wheel supports (34). The rear wheels (22) have an idle position when the big rear wheels (14) are in their driving position, and an active position when the big rear wheels (14) are detached. To make the big wheels (14) unloaded during the detaching/re–attaching and thus favour these working operations, the distance ($H + h_1$) between and essentially horizontal plane through the central longitudinal axis of the undercarriage frame (10) and the outermost, lowermost peripheral point (22') of the path of rotation of the respective, secondary rear wheel (22) in its active driving position, exceeds the corresponding distance (H) of each of the other big rear wheels (14) in their active driving position (Fig. 1).

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Wheelchair provided with jacking apparatus and anti-tip device.

This invention relates to a drivable undercarriage frame for a wheelchair, whereby, in addition to a pair of small front wheels, and a pair of first, big rear wheels, the undercarriage frame is equipped with an extra pair of second, small rear wheels which are normally in a raised, idle stand-by position, out of contact with the ground. These small rear wheels normally serve as a so-called anti-tip device.

In wheelchair undercarriages of this kind, said pair of first, big rear wheels are spaced more widely apart across the longitudinal direction of the wheelchair than the width of the frame and the other pairs of wheels, and are thus decisive for the width of the wheelchair. Said second, small, extra rear wheels are mounted at the end of wheel supports whose opposite ends are rigidly connected to the undercarriage frame.

The width of the wheelchair, corresponding to the distance between said first, big, rear wheels, is often so large that some doorways will be too narrow for the wheelchair to pass.

To solve this problem, said first, big rear wheels are rotatably attached to the undercarriage frame by means of quick-coupling elements known in themselves, so that the big rear wheels may be temporarily detached when the wheelchair is to be used for some time in a building with such narrow doorways. On the removal of the big rear wheels, the small, rear, anti-tip wheels move down to bear against the ground by a pivotal movement made by the undercarriage frame with the front wheel axis as the pivot axis. The front wheel axle may be adjustable in height, so that the height of the axis above the ground may be adjusted.

After the two big rear wheels have been detached, the wheelchair has its largest width reduced to such an extent that it may pass through narrow doorways.

The detaching and the subsequent re-attaching of the big rear wheels are problematic because in the detaching these wheels bear on the ground by a weight corresponding to the weight of the wheelchair and the wheelchair patient.

According to the present invention the aim has been to alleviate this problem and thus enable a comfortable detaching/re-attaching of the big wheels when the largest width of such a wheelchair is to be temporarily reduced because of narrow doorways or other narrow passages.

This aim has been realized by said second, extra, small rear wheels which are normally out of contact with the ground and which serve as anti-tip device, being supported in such a way on the undercarriage frame as specified in the characterizing part of claim 1.

The support device for said second, small, extra rear wheels is thus in general formed so that these extra rear wheels may be brought to work as a jack for the undercarriage frame, said jacking being carried out immediately before the detaching of said first, big rear wheels which are thus in a jacked-up, not loaded position with their circumferentially lowest points at a distance from the ground before and during the detaching.

More specifically, each of said second, rear extra wheels is rotatably supported at the end of a wheel support which is pivotally arranged at its other end to the undercarriage frame, about a largely horizontal, first pivot axis. The wheel support carries a pivotal locking means which is arranged to lock the wheel support in either one of its two main positions, the idle, swung-up, stand-by position as anti-tip device and its working, swung-down, jacking and driving position. The locking means may thus have a locking and blocking portion, engaging in a locking/blocking manner, in each of the two main positions of the locking means in a corresponding, complementary, for example dependent on shape and force, locking and blocking portion formed in the under-carriage frame.

Relative to a horizontal longitudinal axis presumably representing the longitudinal, central axis L of the under-carriage frame, which has a definite extent in height H from the ground, this vertical distance from the longitudinal axis L to the ground H will correspond to the distance from a horizontal plane of the longitudinal axis L and the outer-most, lowermost peripheral point of each of said first, big rear wheels.

To be able to ensure that a jack-up operation with respect to the undercarriage frame/wheelchair is initiated before the big rear wheels are detached, while said second extra, rear, small wheels are swung down into their working position, the distance from a horizontal plane of said longitudinal axis L to the outermost, lowermost circumferential point of either one of said second, small rear wheels in the active, driving position of these wheels, must exceed the height H by an additional height h_1 corresponding to the lifting height by which it is desirable for the lowermost, outermost circumferential point of the big rear wheels to clear the ground, before the detaching of the big rear wheels. On the re-attaching of the big rear wheels, the undercarriage frame is already in the jacked-up position. When the big rear wheels are then in place, re-attached by means of said quick-couplings, the wheel supports for said second, small, extra wheels are swung up into their idle position, possibly as anti-tip device, whereby the tyres of the big rear wheels are lowered to bear on the ground.

In another embodiment the support of the extra wheel, in the form of a pivotal arm, is fixed in its different pivotal positions, especially in its main positions, by means of mutually engageable/releasable locking means, for example in the form of a spring-loaded locking pin or similar loose locking means, which is displaceably arranged in a recess of the inner end of the pivotal support arm of the extra wheel, the outlet end of the recess being formed so that approximately half of the locking means may project and normally be kept in its projecting position by means of a compression spring, so that said projecting part of the locking means/locking pin may be brought into engagement with one of several corresponding edge recesses formed in a

stationary locking part rigidly connected to the under-carriage frame.

When the extra wheel support arm is swung into an upward angle in its idle position, its spring-loaded locking means (the locking pin) may be in a securing engagement with a relatively shallow, groove-like edge recess of said stationary locking part. Thereby the engagement is such that it is maintained as long as the engagement connection is not subjected to external forces. On the other hand, if this pivotal arm is subjected to a downward force by someone intentionally placing his/her foot on the arm, the spring-biased locking pin will be pressed against the action of the compression spring fully into the recess at the inner end of the extra wheel pivotal support arm, whereby the engagement is neutralized so that the extra wheel support arm may be pivoted into its next pivotal position, in which the support arm is pointing backwards in a downward slope. To fix the arm in this pivotal position, corresponding to the anti-tip position of said second, extra rear wheels, in which they are to prevent, in a manner known in itself, the wheelchair from tipping backwards, and in which the big rear wheels are in active positions, the locking pin of the extra wheel support arm engages another groove-like edge recess which has a greater depth than the first edge recess, and which may receive the entire, extending part of the locking pin, to ensure a more powerful engagement than by the shallower, groove-like edge recess.

The support arm of the extra rear wheels may be brought out of this anti-tip position by its spring-loaded locking pin again being pressed fully into the recess at an inner end of the support arm of the extra rear wheels, whereby the locking

action of the locking pin is neutralized, as it is no longer at the same time engaging said deeper edge recess of the stationary locking part rigidly secured to the undercarriage frame. For these locking pin push-in operations a cam disc is used, pivotally arranged in the area of the locking device, and formed with cam portions along its edge, one of several different convex portions, between concave portions, being brought to press against said spring-biased locking pin whenever the cam disc is turned about the pivot point of the support arm of the extra rear wheels on the stationary undercarriage frame. This cam disc also comes into use when the locking effect is to be released while the small extra rear wheels are in their jacking/driving position after the big rear wheels have been re-attached.

These second, extra, small rear wheels may have a brake means arranged thereto, for example brought into action against the respective extra wheel when the wheel is to be transferred into its jacking position. The brake means may be omitted as one may for example place ones foot against one of the extra wheels or against a cross bar connecting the two extra rear wheels.

Non-limiting examples of preferred embodiments of a drivable wheelchair undercarriage according to the invention will be explained in detail in the following, with reference to the drawings, in which Figs. 1 and 2 show a first embodiment, whereas Figs. 3 - 9 show a second embodiment, and in which:

Fig. 1 shows in a sectional side view the driving wheels of the drivable wheelchair undercarriage in the positions they take when the primary front and rear wheels of the wheelchair

are in their working positions and the rear, small, back-up wheels are in their swung-up positions as an anti-tip device;

Fig. 2 shows in a sectional side-view the drivable wheelchair undercarriage with the wheels in the positions that they take when the small rear wheels are swung down into their active position, having jacked up the undercarriage thereby, so that the normal, big rear wheels are in a favourable pressure-relieved detaching position;

Fig. 3 shows a sectional view, from the side, of a drivable wheel-undercarriage, in which the extra, small rear wheels are pivotally supported in accordance with a second embodiment of the invention, the extra rear wheels being shown in their fully swung-up, idle position;

Fig. 4 is an enlarged section of fig. 3 and shows a small extra rear wheel, its pivotal wheel support arm with the locking mechanism arranged thereto in order to lock and fix the wheel support arm in the different main positions of the extra rear wheels, the brake device of the extra rear wheel being in its idle position at a distance from the circumference of the wheel;

Fig. 5 corresponds to fig. 3, but shows the support arm of the extra rear wheels in a pivotal position, in which it is pointed backwards, sloping from the top downwards, corresponding to the anti-tip position of the extra rear wheels, in which they shall be capable of preventing the wheelchair from tipping backwards, with the axis of rotation of the big ordinary rear wheels as the axis of tipping;

Fig. 6 shows an enlarged section of Fig. 5, but in which the brake device is in its active braking position;

Fig. 7 corresponds to Figs. 3 and 5, but shows the pivotal support arm of the extra rear wheel in the jack-up position thereof, corresponding to the active driving position when the big ordinary rear wheels are detached, and in which the brake device of the small extra wheel is brought into its active braking position in abutment against the circumference of the extra rear wheel to prevent this from turning while being brought into the jacking position.

Fig. 8 shows an enlarged section of Fig. 7,

Fig. 9 shows a side view similar to Fig. 8, but with the brake device in its idle position and with the locking pin (locking means) of the pivotal pair of arms in engagement with the recess of the stationary locking part, corresponding to the driving position of the extra wheels;

Fig. 10 shows, in a perspective view, the pair of small, extra rear wheels in the position connected to each other, with the extra rear wheels and their pivotal support arms in the driving position, essentially corresponding to Fig. 9;

Fig. 11 corresponds to Fig. 9, but here the outer pivotal arm of the pair of arms (see Fig. 10) is not removed as in for example Figs. 8 and 9 to show a longitudinal, elongate, guiding, retaining and supporting slot for the transverse locking pin.

In the two embodiments identical or functionally identical parts are given the same reference numerals.

In the following the embodiment shown in Figs. 1 and 2 will be described first:

The undercarriage of the wheelchair has a horizontal frame 10 carrying a supporting element 12 for a pair of first, big rear wheels 14, of which the first one hides the rear one in the drawings. The transverse axle 16 for the big rear wheels 14 has several different support holes 18 offset in relation to one another along both the length and the height of the wheelchair.

The undercarriage frame 10 has a horizontally extending, central longitudinal axis 20 thought to be located in an imaginary, horizontal plane, which will be reverted to in connection with the sizing of the two pairs of rear wheels, namely the big rear wheels 14 used as long as the wheelchair is able to pass through relatively narrow doorways, and a second set of small extra rear wheels 22 which normally adopt the swung-up, idle stand-by position shown in Fig. 1 and may then serve as an anti-tip device.

A pair of front wheels 24 is mounted on wheel supports 26 which point from the top in a forward/downward slope, and which are formed with several support holes 28 distributed along their longitudinal direction, for the axles 30 of the front wheels, in order to enable the mounting of the axles 30 at different levels.

At its rear end the undercarriage frame 10 has a vertically depending fitting 32 mounted thereon, which forms, at its

upper end, a pivotal support for an elongate, angled wheel support 34. There is one wheel support 34 with pivot axle 36 for each second, small rear wheel 22. The wheel supports 34 with their locking devices are identical and only one such device will be described in the following:

Each wheel support 34 is provided with a pivotal locking and blocking means 38 which is essentially angled.

Thus the locking and blocking means 38 has a rounded locking portion 38', in both positions of the wheel support 34 and the rear wheel 2 securingly engaging a downwards open recess 40 of the end fitting 32, the locking portion 38' of the locking and blocking means 38 being secured, depending on form and force, in the locking recess 40 in both positions of said second rear wheel 22.

In the unloaded state the engagement of the locking portion 38' in the locking recess 40 is sufficiently deep for the locking and blocking means 38 not to be pivoted out of this engagement.

The second angle section 38'' of the locking and blocking means 38 is an operating arm (operating pedal) which is pressed down by the foot from the position shown in Fig. 1 during an anti-clockwise pivoting of the means 38 down into the position shown in Fig. 2, in which said second, small rear wheels 22 are in an active driving position.

Thereby the locking portion 38' of the locking and blocking means 38 is pressed upwards and further into the locking recess 40 of the fitting 32 until the upper, outer, rounded surface of the locking portion 38' reaches the bottom of the

upper end portion of the complementarily shaped recess 40 of the fitting.

To secure the wheel supports 34 in this active driving position, locked and blocked in itself, the locking and blocking means 38 may be provided with a transverse hole 42 extending therethrough, which corresponds, in the position shown in Fig. 2, with a spring-loaded locking pin 44 on the locking fitting 32. Thereby security is achieved against the back-up rear wheels 22 dislodging from their driving position.

Reverting now to the above-mentioned imaginary horizontal plane through the central longitudinal axis 20 of the wheelchair undercarriage frame 10;

In Fig. 1 the height H represents the vertical distance of the longitudinal axis 20 from said horizontal plane to the outermost, lowermost circumferential points 14' and 24', of the paths of rotation of the big rear wheels 14 and the small front wheels 24, respectively.

In order for the undercarriage frame portion carrying the big, detachable rear wheels 14 to be jacked up to a sufficient extent, for example in the order of 1,0 cm (h_1) from the ground to the lowermost peripheral point 14' of the path of rotation, either one of the small rear wheels 22 plus their wheel supports must have such a longitudinal extent that the distance from said horizontal plane through the longitudinal axis 20 of the undercarriage frame 10 to the outermost, lowermost, peripheral point 22', Fig. 2, will be larger than H, i.e. equal to $H + h_1$.

The embodiment shown in Figs. 3 - 11 has many similarities to the embodiment described above, and constructional and/or functionally identical parts have been given the same reference numerals as in Figs. 1 and 2.

The parts incorporated in the drivable wheelchair under-carriage, such as front wheels 24, big, ordinary rear wheels 14 and small, extra rear wheels 22 with pivotal wheel support arms 34 in general, will not be described again in connection with this second embodiment; neither will the set of problems nor the general solutions be repeated. However, the outer pivotal arm of the pair of arms 34 is only shown in Figs. 10 and 11 to show a particular guiding, retaining and supporting slot for a locking means described later, and new features of the outer pivotal arm will be discussed later in connection with Fig. 11.

Each of the small, extra rear wheels 22 is rotatably supported between two of a pair of plate-shaped wheel support arms 34 which are pivotally supported on a trunnion 36; all as in the previous embodiment. Contrary to the angled wheel support arm 34 of the first embodiment, the wheel support arm 34 of this embodiment, Figs. 3 - 11, is straight.

Each of said second, small, extra rear wheels 22 has a brake means 46 arranged thereto, in the form of a two-armed balance rod pivotal on a central point between each pair of wheel support arms 34, its free end having a brake wire 48 arranged thereto, which is secured at its opposite end, in a known manner, to the handle of a hand brake (not shown). The hand brake handle is secured by the wheelchair push-handle located above the back of the chair, and the brake is operated by the assistant pushing the wheelchair.

Instead of using a brake device, the foot may be put on the extra rear wheel 22 to prevent it from turning during the pivoting of the wheel support arms 34 about the stationary axis 36 from the anti-tip position shown in Figs. 5 and 6 into the jacking position shown in Figs. 7 and 8. The braking is neutralized when the extra, rear wheels have taken the locked position.

In Figs. 3 and 4 the small, extra rear wheels 22 and their pivotal wheel support arms 34 are shown in an idle position in which the arms 34 point upwards/backwards, sloping from their pivot points 36. This position may be used when the wheelchair is pushed by an assistant. In Figs. 5 and 6 is shown an anti-tip position which may be used when the user of the wheelchair drives the chair alone by turning the wheels 14 by hand.

Thus, the small, extra rear wheels 22 and their pivotal wheel support arms 34 have several different positions.

These different pivotal positions of the pivotal wheel support arms 34 of the small, extra rear wheels 22 must be able to be locked and fixed in position, and it must also be possible for the respective, locked fixation of position to be neutralized when the small, extra rear wheels are to be placed in one of their other main positions. Accordingly, a locking mechanism and a release mechanism are required for each small, extra rear wheel.

The locking mechanism consists of a stationary (frame-fixed) locking part 52 provided with a pin 53 which is pushed into and secured to the undercarriage frame 10. The locking mechanism 52 is formed with a circular-arc-shaped

circumferential edge portion 52' with its centre at the pivot point 36 of the wheel support arm 34 and formed with three edge recesses 54, 54', 54'' distributed along its circumferential portion, Figs. 3 and 4; the shape of one edge recess 54'' appearing best from Figs. 6 and 8.

One of these edge recesses 54, 54', 54'' at a time works as the locking recess for a cooperating locking means 56, preferably in the form of a locking pin which is displaceably arranged in a spring chamber 58 formed near the end portion of the respective, extra rear wheel support arm 34, at a certain distance from the pivot point 36 thereof. This spring chamber 58 accommodates a compression spring 60 for the locking pin 56, possibly two compression springs 60 spaced apart by a certain distance.

In Fig. 11 is shown a possible embodiment of the support, guiding and restriction of movement of the locking pin 56. The spring chamber 58 receives the compression spring 60 and may in addition receive the entire locking pin 56 so that it may be brought completely out of engagement with the respective edge recess 54, 54' or 54''.

For support, guiding and restriction of movement of the locking pin 56, the locking pin 56 may have an elongate slot 74 arranged thereto, extending in the longitudinal direction of the respective pivotal arm 34 and displaceably engaged by an outer end portion of the locking pin 56.

Neutralization of an established engagement of a stationary locking recess 54, 54' or 54'' and the locking pin 56 is effected by means of a cam-disc-based, engagement-

neutralizing release mechanism 62 pivotal on the trunnion 36 of the adjacent wheel support arm 34.

Along a certain portion of its circumferential edge, the cam disc 62 of the release mechanism has two successive, convex cam surfaces 66, 66' facing the locking pin 56 and having an intermediate concave transition portion 68. The convex cam surfaces 66, 66' are each defined by a dog, 70 and 70' respectively. The cam discs 62, 64 are interconnected by a cross bar 72, Fig. 10.

When the locking pin 56 is engaged in one of the edge recesses 54'', 54', 54, the concave transition portion 68 of the cam disc 62 is right opposite the locking pin 56. By the pivoting of the extra, rear wheels 22 and their wheel support arms 34 from the position shown in Fig. 4 into that shown in Fig. 5, which normally takes place by pressure being exerted by a person's foot on the transverse rod 50 for an anti-clockwise pivoting, the cam disc 62 will follow with its laterally projecting securing portion 64 for the cross bar 72 or the wheel support arm 34. Thus, there is no relative pivoting of these parts. When the wheel support arms 34 reach the anti-tip position for the small, extra rear wheels, Figs. 5 and 6, the locking pin 56 clicks into the deep middle recess 54'.

When this deep engagement is to be neutralized, the cam-disc-based, engagement-neutralizing release mechanism 62 must be put to use.

From the position of the wheel support arm 34 and the cam disc 62 shown in Fig. 5, to the position shown in Fig. 6, it is only the cam disc 62 which has changed its pivotal

position, as it has been pivoted clockwise in relation to the position of the locking pin 56 so that the concave cam surface 66 has been passed over the locking pin 56 and thereby has pressed the locking pin 56 out of the edge recess 54' and into the spring chamber 58 mouth portion forming a locking-pin-receiving chamber region, during the compression of the spring 60.

From the anti-tip position shown in Fig. 5 to the jacking position shown in Fig. 7, the wheel support arm 34 is pivoted together with the cam disc 62 about the pivot point 36. As mentioned earlier, the brake device for the small, extra rear wheels 22 may be activated immediately before the jacking position is established. Then, when the wheelchair is pulled backwards, the lower portion of the wheel support arm 34 will be at rest while its upper portion will move backwards until the locking pin 56 engages the edge recess 54. In Fig. 7 the jack-up height h_1 is indicated.

In Fig. 8 is shown a situation in which the small, extra rear wheels 22 have been in the driving position, but are now to be transferred to either the anti-tip position, Fig. 5, or the idle position, Figs. 3 and 4, the locking pin 56 having been brought out of its engagement with the edge recess 54 by means of the cam disc 62. The wheel support arms 34 are pivoted clockwise from the position shown in Fig. 8 together with the associated cam discs 62, until the locking pin 56 has come right opposite the edge recess 54' or the shallow edge recess 54''. For the establishing of a new engagement as mentioned, the cam disc 62 is pivoted in relation to the adjacent wheel support arm 34 so that the concave transition portion 68 between the two convex cam surfaces 66, 66' come into a position right opposite the locking pin 56.

In Fig. 8 the brake means 46 is shown in its working position. This only applies to its transitional movement into the jacking position. In the shown transitional position from the driving position of the small, extra rear wheels back into the anti-tip or idle position, the brake means 46 will not be activated.

In Fig. 9 - 11 the brake means 46 is shown in its idle position and with the locking pin 56 in engagement with the edge recess 54 of the stationary locking part 52, corresponding to the driving position of the rear, extra wheels 22.

C L A I M S

1. A drivable undercarriage for a wheelchair, comprising an undercarriage frame (10) on which are mounted front wheels (24), primary big detachable/re-attachable rear wheels (14) and secondary, smaller, extra rear wheels (22), c h a r a c t e r i z e d i n that said secondary extra rear wheels (22) have a jacking position in which the undercarriage frame (10) is jacked up so that lowermost peripheral points (14') of said primary rear wheels are positioned above the ground before and during the detaching/re-attaching.

2. A drivable undercarriage (10) for a wheelchair, comprising front wheels 24, primary, big, detachable rear wheels (14) and secondary smaller rear wheels (22) which are attached to the undercarriage frame (10) by wheel supports (34) and have two main positions, one stand-by position (anti-tip position of the wheelchair) when the primary, big rear wheels (14) take their active driving position, and an active driving position when the primary, big rear wheels (14) are detached, c h a r a c t e r i z e d i n that the wheel support (34) of each secondary rear wheel (22) is pivotally mounted on the undercarriage frame (10) for pivoting between said main positions, and are provided with a locking means (38; 62, 68) for locking the wheel support (34) in each of its main positions, one of which is a combined jacking and driving position, and that the distance $(H + h_1)$ between a horizontal or approximately horizontal plane through the central longitudinal axis (20) of the undercarriage frame (10), and the outermost, lowermost peripheral point (22') of the path of rotation of the secondary, small rear wheel (22) in the active driving

position, exceeds the corresponding distance (H) of each of the other wheels (14, 24) in their active driving positions.

3. A drivable undercarriage for a wheelchair according to claim 1 or 2, c h a r a c t e r i z e d i n that the locking means (38) of said wheel support (34) or pair of wheel supports (34, 34) consists of an essentially angle-shaped, pivotal plate body with two arms (38', 38''), one (38') of them constituting a locking means cooperating in a locking manner with a stationary, matchingly shaped locking portion (40) by the undercarriage frame (10), the other arm (38'') constituting an operating arm or pedal that may be used when said wheel support (34) is to be pivoted from the idle stand-by position of the respective secondary rear wheel (22) into the active driving position.

4. A drivable undercarriage for a wheelchair according to claim 2, c h a r a c t e r i z e d i n that the locking portion (38') of the locking means (38) is formed by a preferably rounded end which cooperates with a downwards open recess (40) which forms the stationary locking portion connected to the undercarriage frame (10), and that the upper end of the locking recess (40) is formed complementary to the preferably rounded, pivotal locking portion (38') which in the idle stand-by position of the respective secondary rear wheel (22) is in engagement with a lower portion near the opening of the locking recess (40), and which in the active driving position of the respective secondary rear wheel (22) is in engagement with the upper end of the recess (40), or with the edge portions of a fitting part (32) defining said portions of the recess (40).

5. A drivable undercarriage for a wheelchair according to any one of the preceding claims, characterized in that said wheel support/pair of wheel supports (34) has an extra securing device (44), for example a spring-loaded locking pin which is brought in line with and into engagement with a matching extra securing means (42) on the locking means (38), for example in the form of a transverse hole, when the locking portions (38', 40) are in engagement in the active driving position of the secondary rear wheels (22).

6. A drivable undercarriage for a wheelchair according to claim 1 or 2, characterized in that the wheel support arm/pair of wheel support arms (34) and a stationary locking part (52) rigidly connected with the undercarriage frame (10) are provided with releasably cooperating locking means (56 and 54, 54', 54'') entering into mutual engagement in the main positions (idle position, anti-tip position, combined jacking and driving position) of the secondary, small rear wheels (22) and retain the wheel support arm/pair of wheel support arms (34) in these positions until the engaged locking means (56 and 54, 54', 54'') are intentionally influenced by an engagement-neutralizing release device (62).

7. A drivable undercarriage for a wheelchair according to claim 6, characterized in that the locking means of the wheel support arm/pair of wheel support arms (34) consists of a locking pin (56) spring-loaded in the direction of the stationary locking part (52), and that the stationary locking part (52) is formed with edge recesses (54, 54', 54'') spaced apart along a circumferential edge portion of said locking part (52), said spring-loaded locking pin (56) being arranged to click into the respective edge

recess (54, 54', 54'') and retain the respective wheel support arm/pair of wheel support arms (34) locked in the respective main position, a cam-disc-based engagement-neutralizing release device (62) being provided, which, when intentionally influenced, is arranged to be able to press the spring-loaded locking pin (56) into a recess (58) formed in the adjacent wheel support arm (34) or into a part secured thereto, so that the engagement between said locking pin (56) and the respective locking recess (54, 54', 54'') is neutralized, whereby the wheel support arm/pair of wheel support arms (34) may be pivoted into another position.

8. A drivable undercarriage for a wheelchair according to claims 6 and 7, characterized in that the cam-disc-based engagement-neutralizing release device (62) is pivotally supported on the pivot (36) of the wheel support arm (34) and exhibits, by the circumferential portion facing the spring-loaded locking pin (56) of the wheel support arm/pair of wheel support arms (34), two convex circumferential portions (66, 66') with an intermediate concave transition portion (68), towards which said locking pin (56) is oriented and partly engages, when the secondary, small, extra rear wheels (22) are in one of their main positions, and said spring-loaded locking pin (56) is in engagement with one of the edge recesses (54, 54', 54'') of the stationary locking part (52).

9. A drivable undercarriage for a wheelchair according to claim 8, characterized in that along its circumferential direction at opposite outer ends of said two convex circumferential portions (66,66') said cam-disc-based, pivotal release device (62) has projecting dogs (70, 70').

10. A drivable undercarriage for a wheelchair according to claims 1 and 6, characterized in that at least one of the secondary, small, extra rear wheels (22) has a brake device (46,48) arranged thereto, and by means of which it is possible to brake the small extra wheels (22), for example immediately before they are to be transferred into the jacking position.

11. A drivable undercarriage for a wheelchair according to any one of the claims 6 - 10, characterized in that said engagement-neutralizing release devices (62) arranged to the wheel support arms (34) of the two secondary, small, extra rear wheels (22) are connected by means of a cross bar (72).

12. A drivable undercarriage for a wheelchair according to any one of the claims 10 and 11, characterized in that the active means (46) of the two brake devices (46, 48) are pivotal about a horizontal axis which may be constituted by a transverse rod (50).

13, A drivable undercarriage for a wheelchair according to any one of the claims 6 - 8, characterized in that the spring-loaded locking pin (56) is oriented transversely to the longitudinal direction of said pivotal arms (34) and displaceably arranged in said longitudinal direction in elongate guide slots 74 displaceably engaged by the end portions of the locking pin (56).

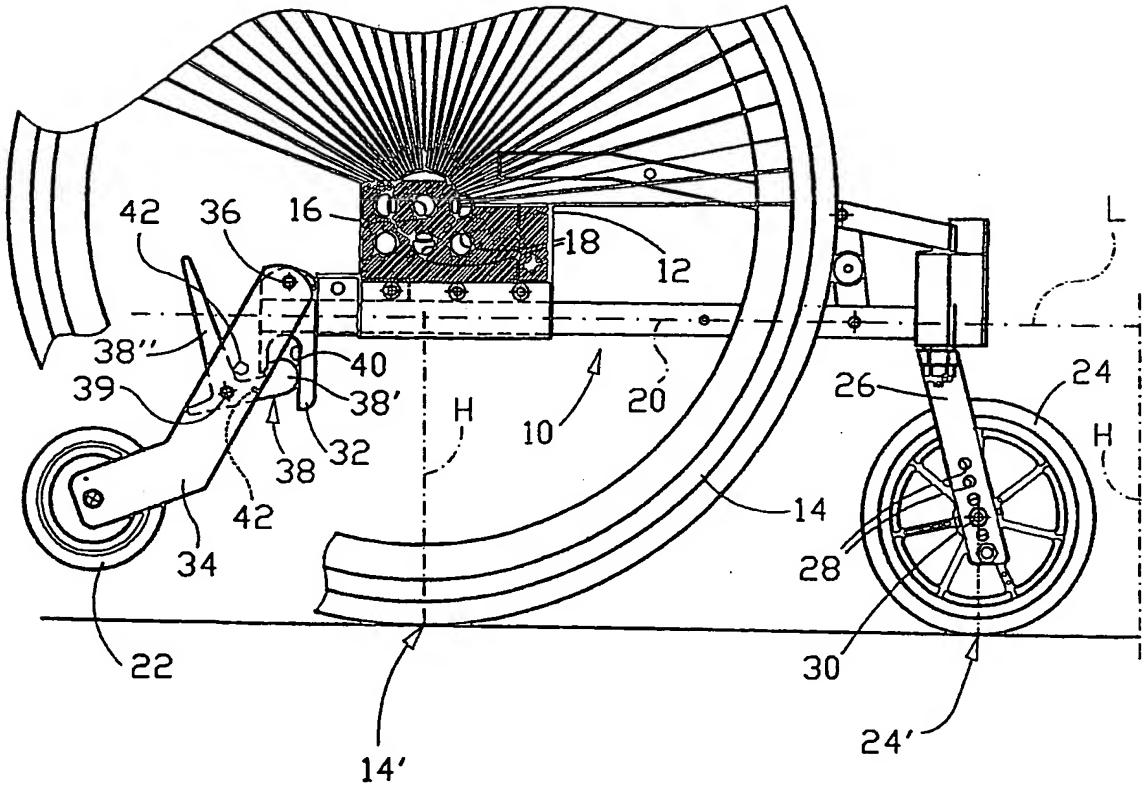

Fig. 1

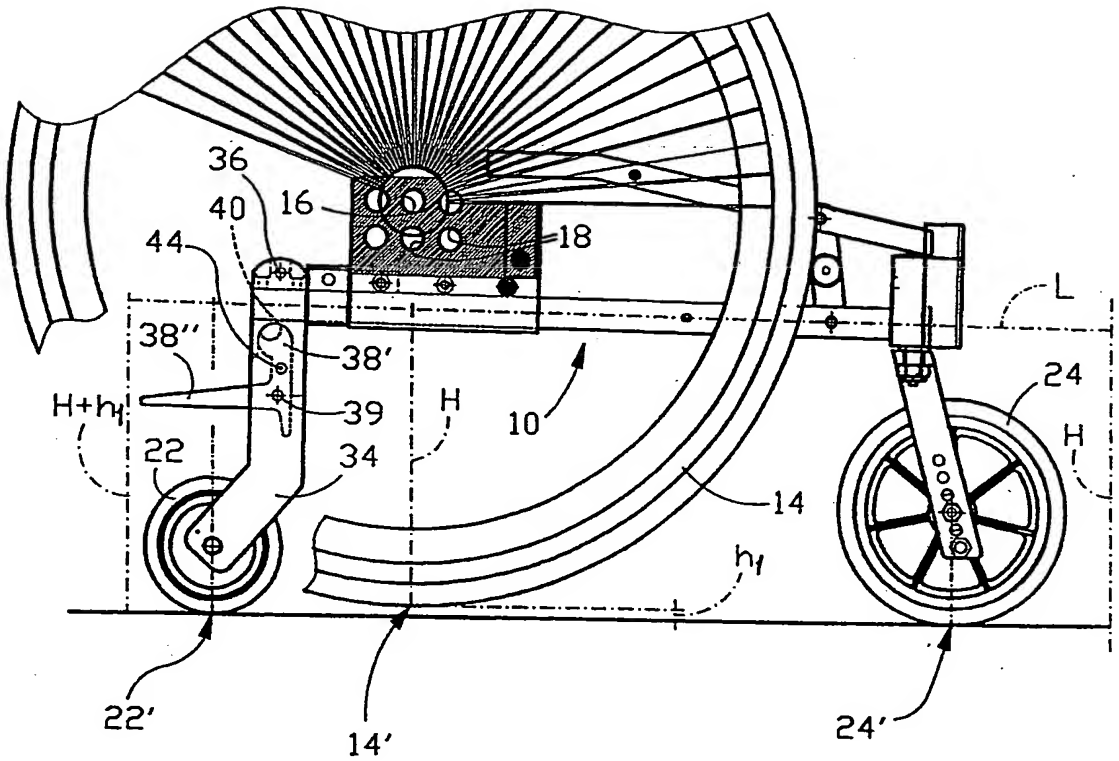

Fig. 2

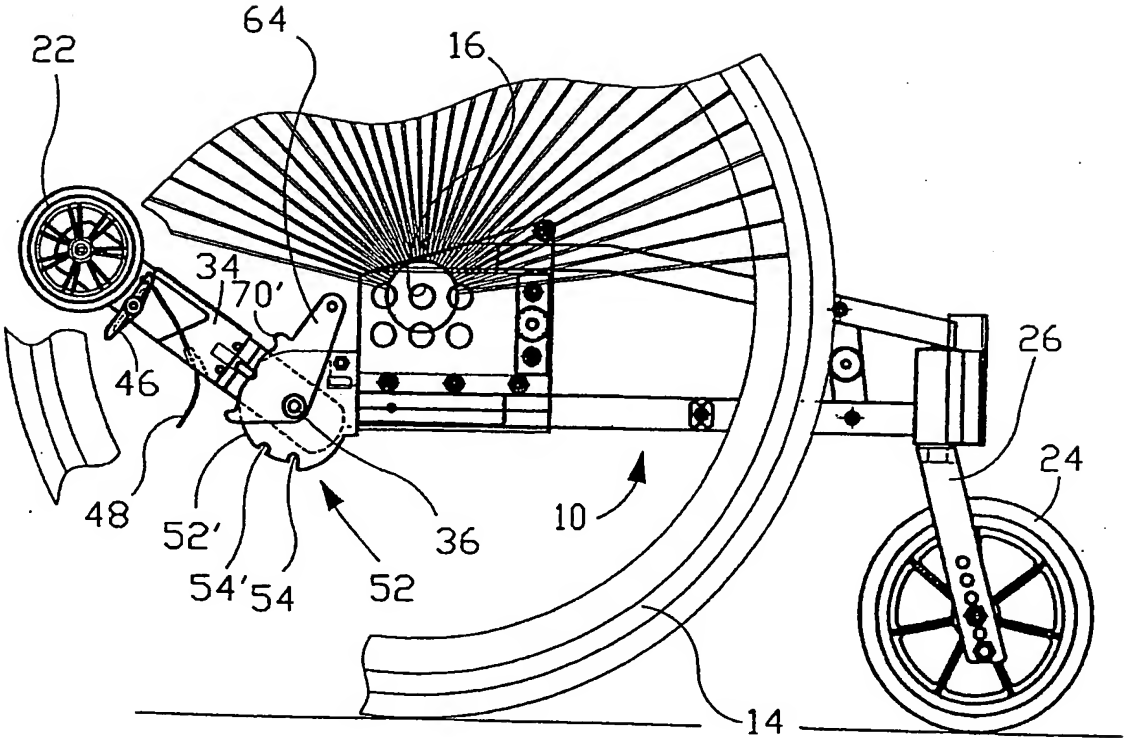

Fig. 3

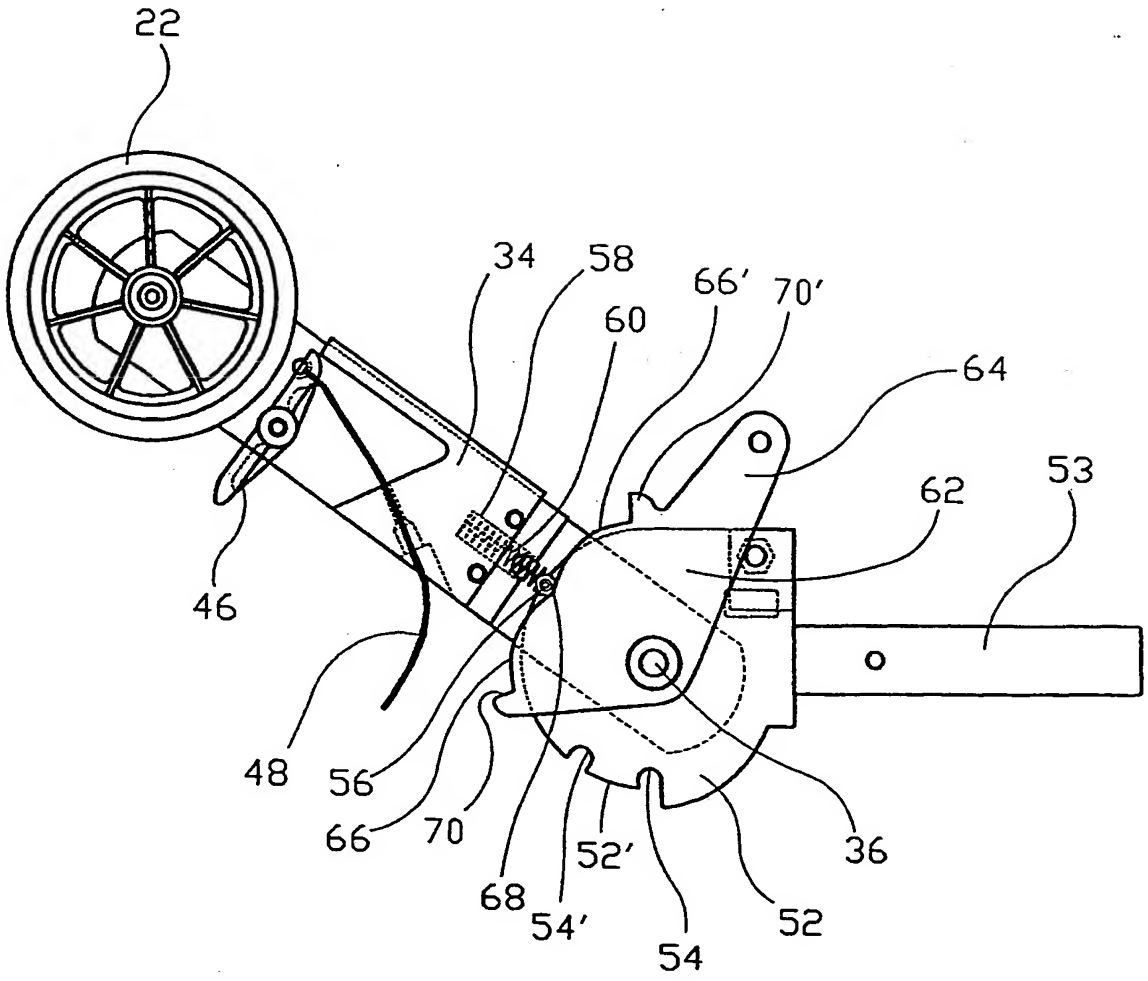

Fig. 4

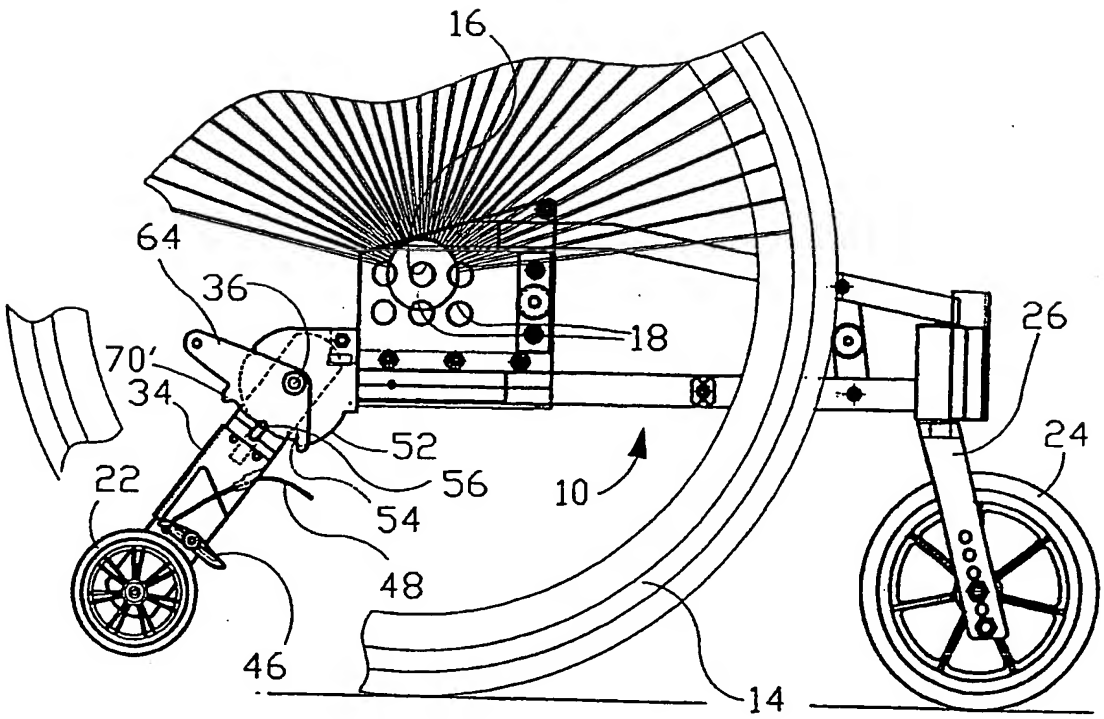

Fig. 5

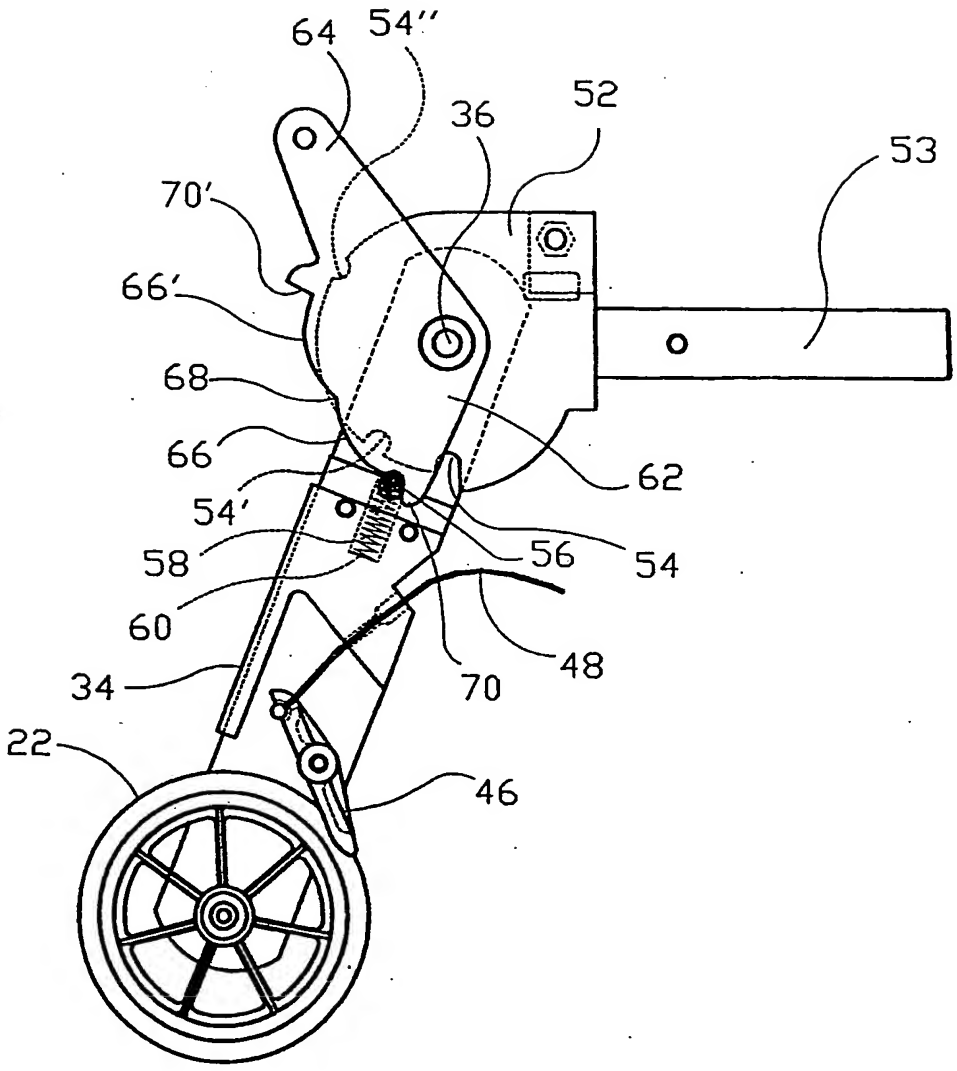

Fig. 6

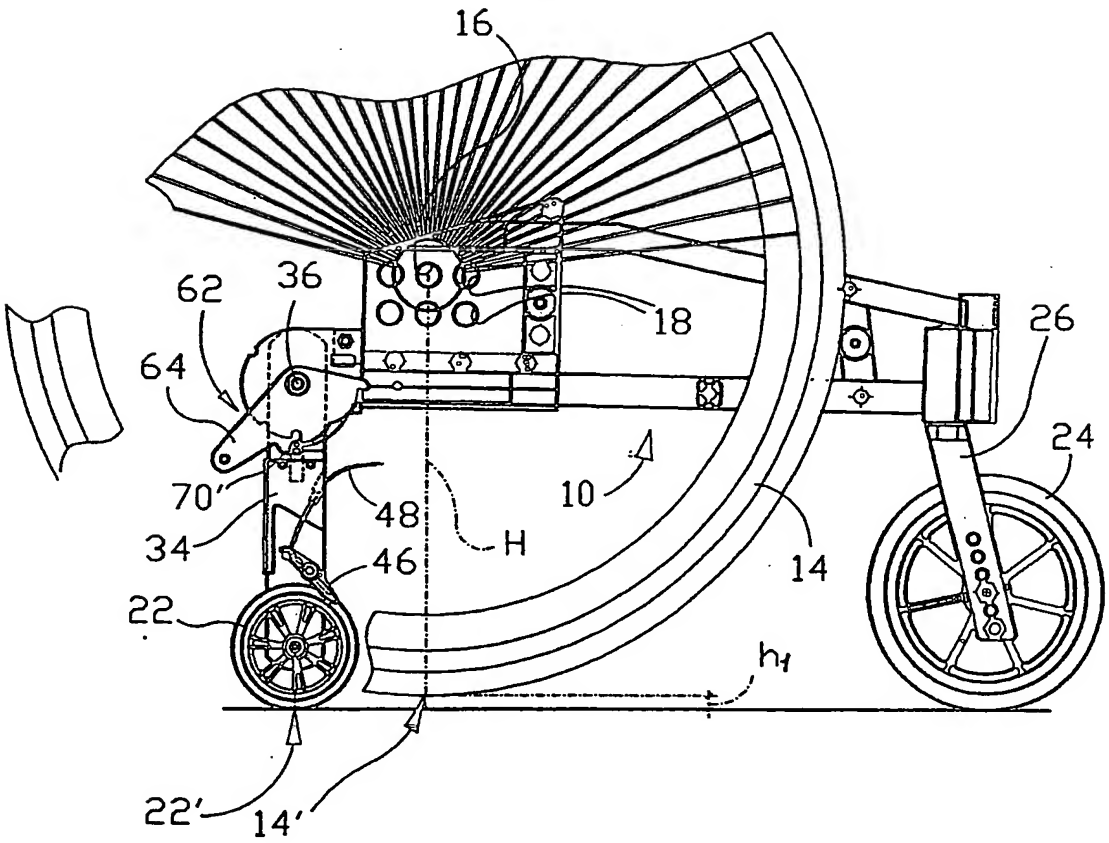

Fig. 7

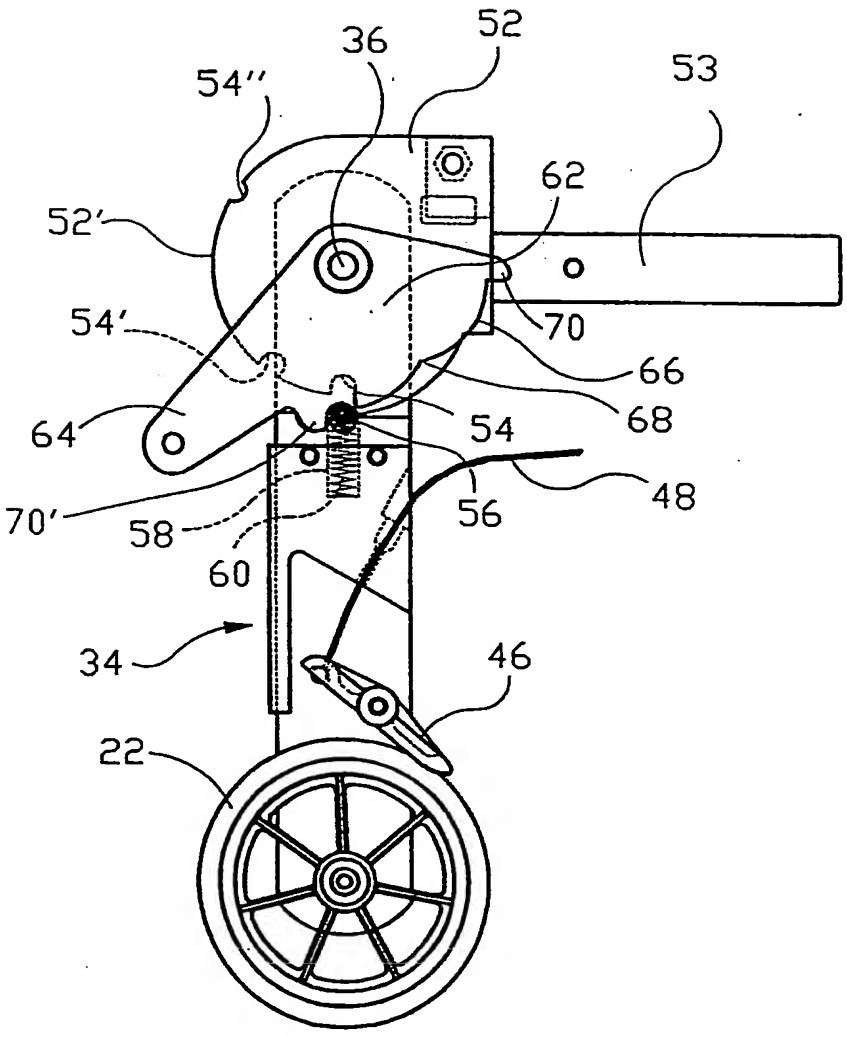

Fig. 8

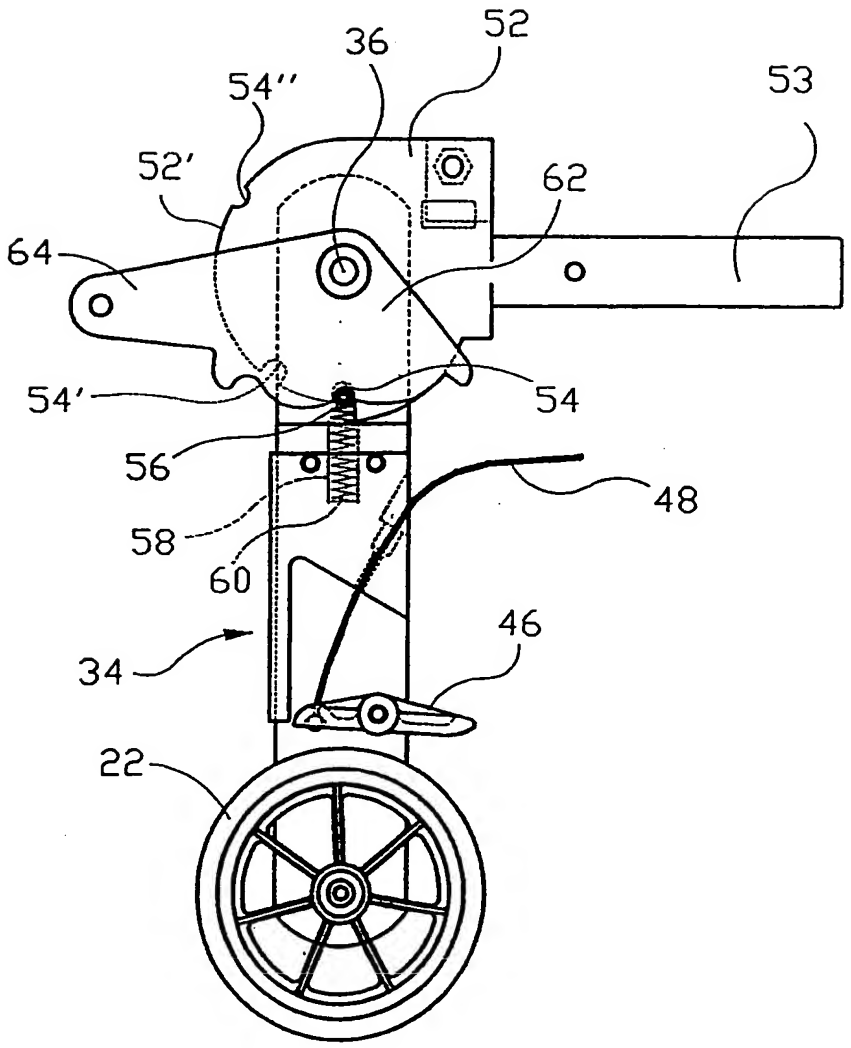

Fig. 9

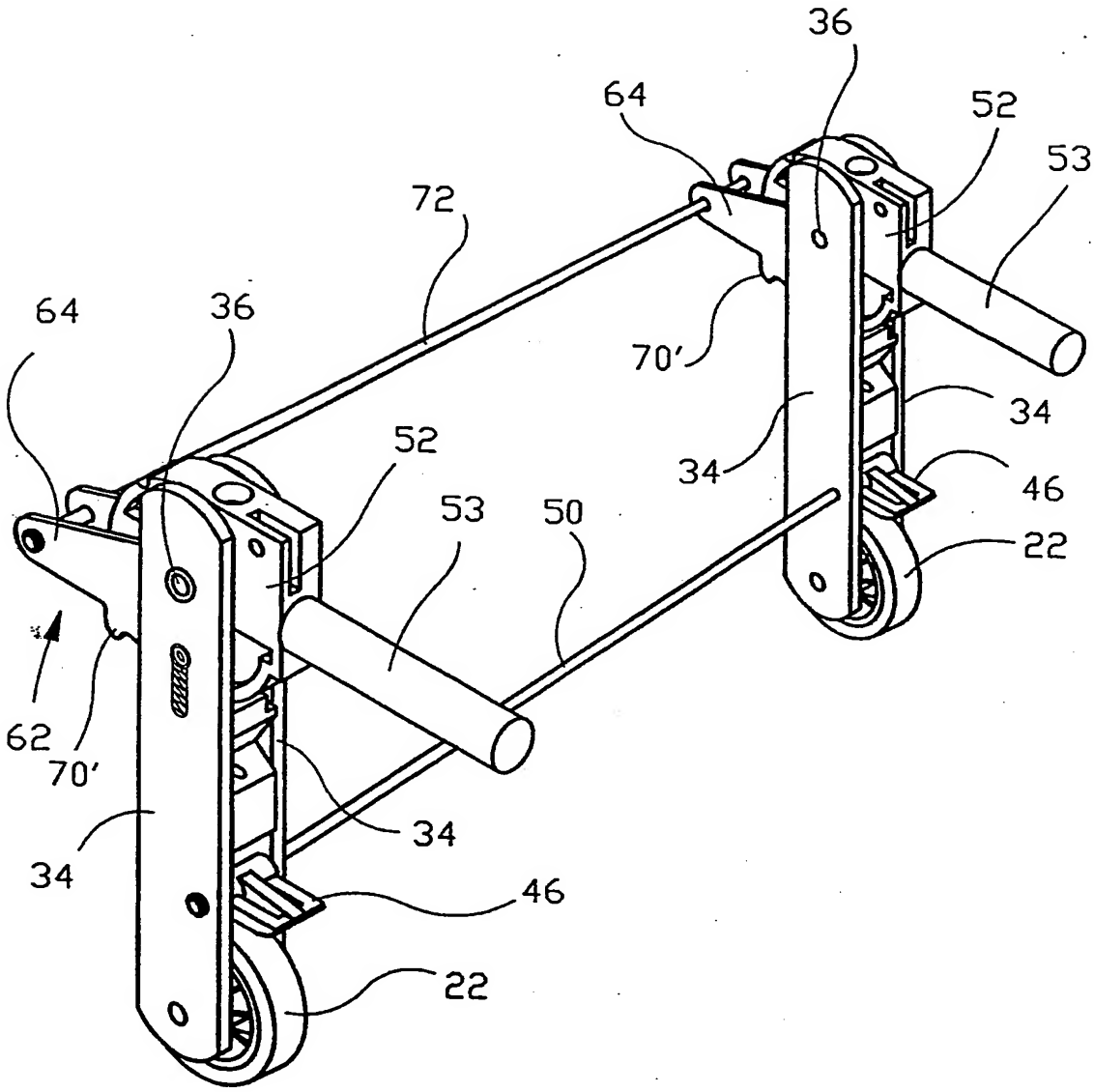

Fig. 10

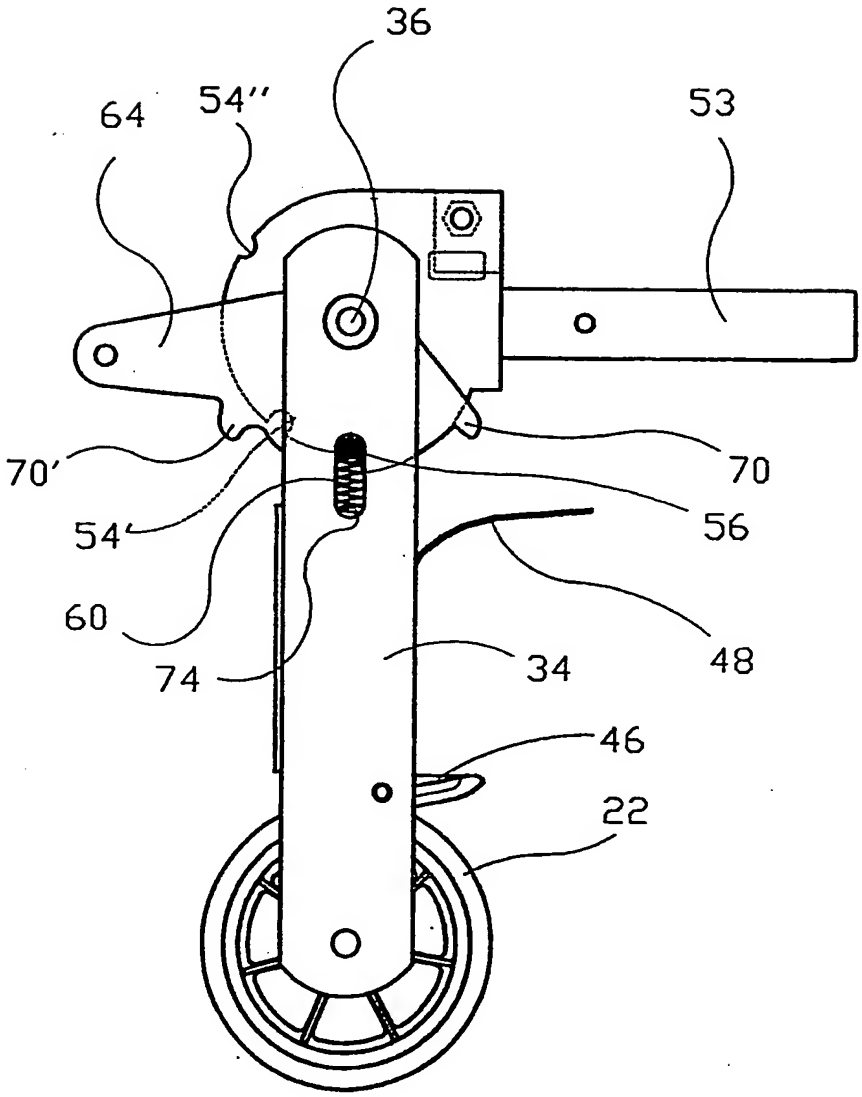

Fig. 11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO 99/00267

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A61G 5/10
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A61G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 3239472 A1 (THE SPASTICS SOCIETY), 5 May 1983 (05.05.83), page 14 - page 16, figure 2	1
A		2-13
	--	
P,X	DE 19712453 A1 (SORG ROLLSTUHLTECHNIK GMBH + CO. KG), 8 October 1998 (08.10.98)	1
A		2-13
	--	
X	US 4515385 A (D.W. CHRISTIAN), 7 May 1985 (07.05.85), column 4, line 27 - column 5, line 29, figures 2,3	1
A		2-13
	--	

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" erlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 December 1999	
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Anette Hall / MR Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

02/12/99

International application No.
PCT/NO 99/00267

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 3239472 A1	05/05/83	FR 2515031 A,B	29/04/83
		GB 2113160 A,B	03/08/83
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DE 19712453 A1	08/10/98	NONE	
US 4515385 A	07/05/85	AU 8688882 A	07/12/82
		CA 1192482 A	27/08/85
		EP 0081564 A	22/06/83
		WO 8204231 A	09/12/82